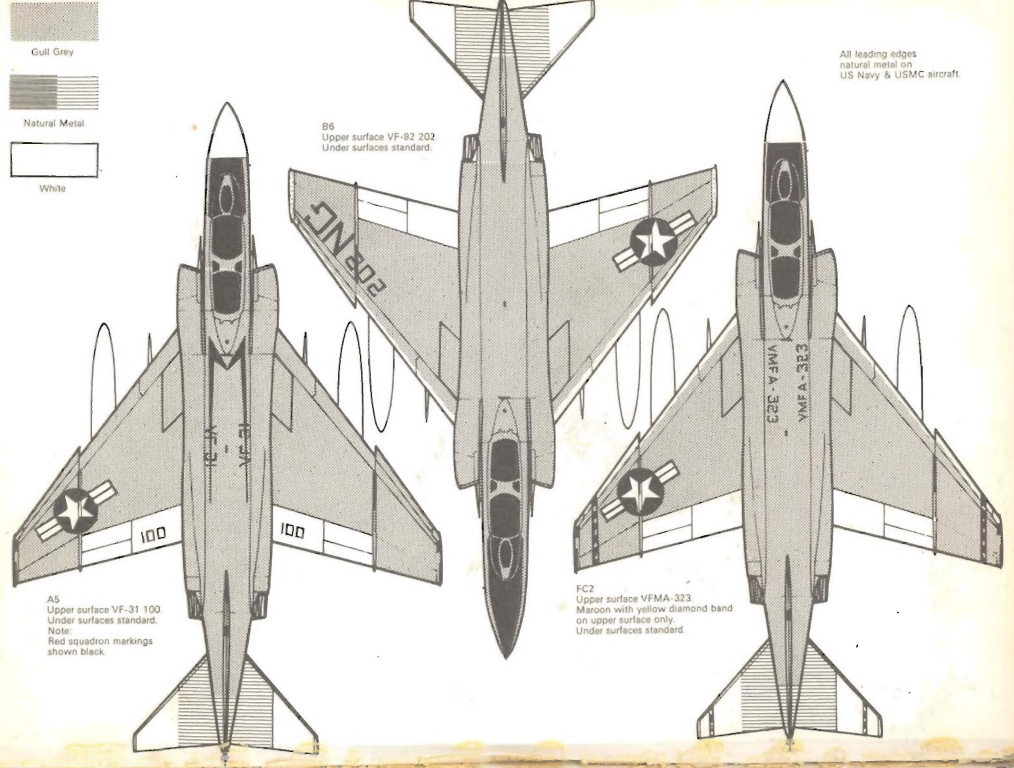
AIRCAM AVIATION SERIES

№30
(Vol.1)

McDONNELL F-4 PHANTOM II

IN US NAVY·USMC·USAF·RAF·FAA·RAAF LUFTWAFFE & FOREIGN SERVICE


Gull Grey
Natural Metal
White
All leading edges
natural metal on
US Navy & USMC aircraft.
B6
Upper surface VF-92 202.
Under surfaces standard.
A5
Upper surface VF-31 100.
Under surfaces standard.
Note:
Red squadron markings
shown black.
FC2
Upper surface VFMA-323.
Maroon with yellow diamond band
on upper surface only.
Under surfaces standard.

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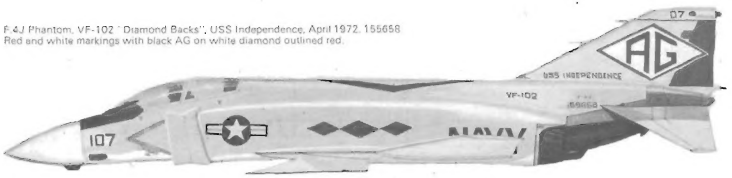

F-4J Phantom, VF-102 "Diamond Backs", USS Independence, April 1972, 155668. Red and white markings with black AG on white diamond outlined red.

McDONNELL F-4 PHANTOM II
IN US NAVY-USMC-USAF-RAF-FAA-RAAF LUFTWAFFE & FOREIGN SERVICE

Illustrated by Richard Ward

Compiled by Richard Ward & Rene J. Francillon

Text by Rene J. Francillon

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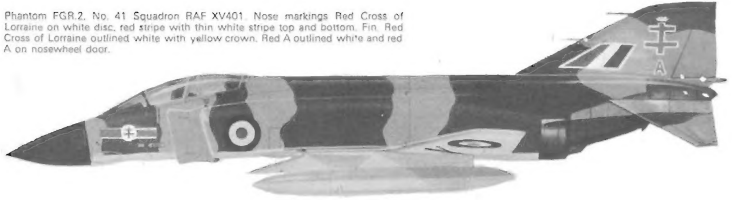
ACKNOWLEDGEMENTS

The Phantom II, backbone of the three US services in the air war over the Indo-China Peninsular since its entry into combat in 1964. This book, Volume 1, covers the US NAVY and US MARINE CORPS in some detail, the USAF in less detail. Volume 2 will reverse this order. Thanks are due to all those who assisted with photographs and information whose names are listed below in alphabetical order: AAHS, J. G. Handelman, Lt.Col. A. P. de Jong, G. H. Kamphuis, D. A. Kasulka, P. R. March, McDonnell, D. A. Noble, RAF-MoD, Hans Redeman, RN-MoD, F. C. Roos, J. W. R. Taylor, Kurt Thomsen, USAF, US MARINE CORPS, US NAVY.



Phantom FGR.2, No. 41 Squadron RAF XV401. Nose markings Red Cross of Lorraine on white disc, red stripe with thin white stripe top and bottom. Fin Red Cross of Lorraine outlined white with yellow crown. Red A outlined white and red A on nosewheel door.

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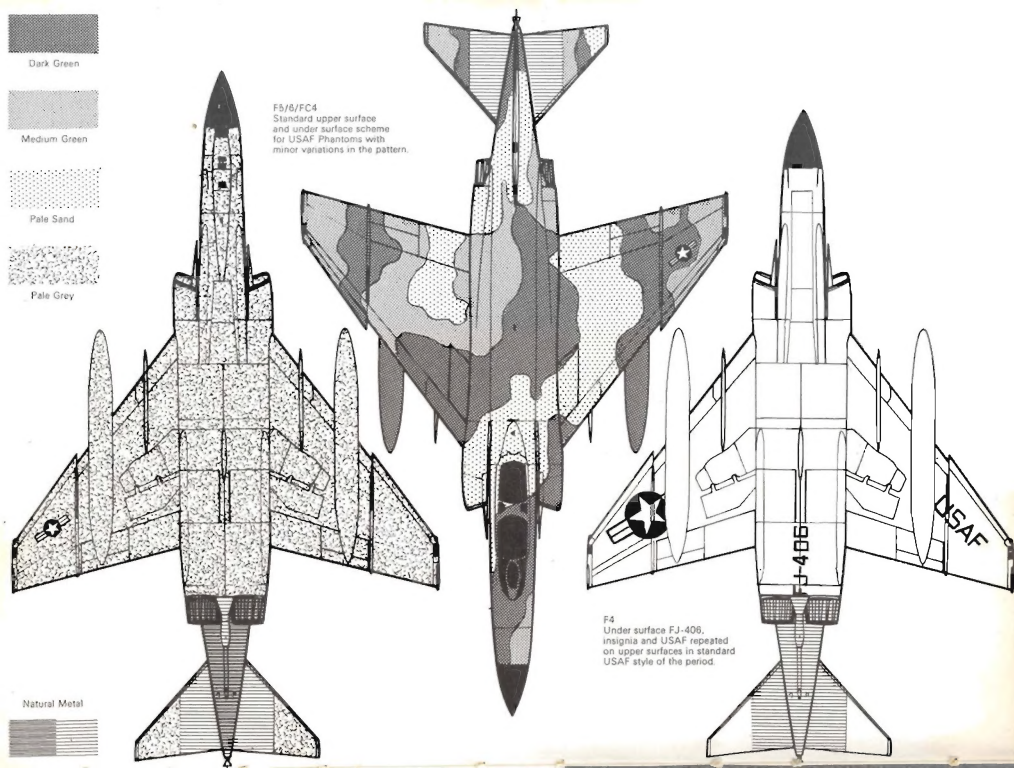
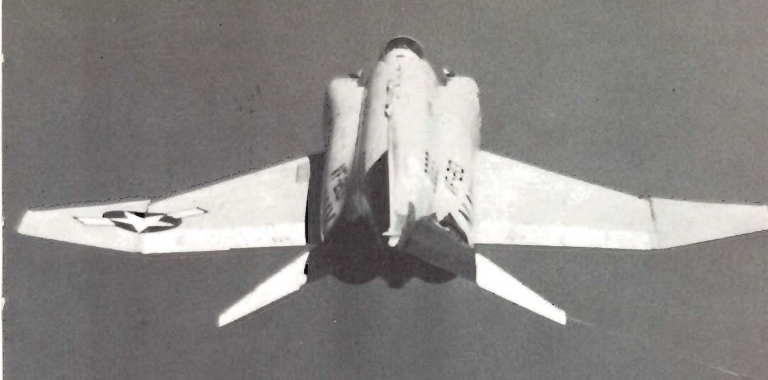

Dark Green
Medium Green
Pale Sand
Pale Grey
Natural Metal
F5/6/FC4
Standard upper surface and under surface scheme for USAF Phantoms with minor variations in the pattern.
F4
Under surface FJ-406, insignia and USAF repeated on upper surfaces in standard USAF style of the period.
FJ-406
USAF



An F-4B Phantom of VF-213 commences letdown prior to recovery aboard the attack carrier USS Kitty Hawk CVA-63 following a combat mission over North Vietnam, Gulf of Tonkin, March 1968. (US Navy via R. J. Francillon)

McDONNELL F-4 PHANTOM II

Mainstay of the U.S. forces in the air war over the Indo-China Peninsula, the McDonnell Phantom first went into combat on 5 August 1964 when F-4Bs of Fighting Squadrons 142 and 143 (VF-142 "Ghost Riders" and VF-163 "Pukin Dogs"), operating off the U.S.S. *Constellation* (CVA-64) in the Gulf of Tonkin, escorted attack aircraft striking motor torpedo boats and their supporting facilities at five locations along the coast of North Vietnam. Initial sorties encountered little resistance in the air and the first U.S. victories in air combat over Vietnam were recorded more than ten months later when Cdr. L. C. Page and Lt. J. E. D. Batson flying F-4Bs of VF-21 "Free Lancers" intercepted four MiG-17s, and each shot down one.

Following this historical action air combat in North Vietnamese sky intensified and Phantoms played an increasingly important role until 1 November 1968 when all bombing of North Vietnam was halted at 21.00 hours Saigon time. While Phantoms and other U.S. combat aircraft were then for the most part assigned to war operations in other areas in the Indo-China peninsula, some continued to fly occasional sorties over the North primarily to escort unarmed reconnaissance aircraft and, less frequently, to silence North Vietnamese anti-aircraft guns and surface-to-surface missile batteries. During some of these missions MiGs challenged the U.S. aircraft and in the course of ensuing dogfights Phantoms claimed several more enemy aircraft, the first of which being a MiG-21 shot down by an F-4J of VF-162 on 28 March 1970.

The lull in the air war over North Vietnam was accompanied by the intensification of the Vietnamisation programme, and resulted in the return to the United States of several Phantom units of the USAF, U.S. Navy and U.S. Marine Corps. However, following the big Communist ground offensive which got under way on 1 April 1972, bombing of the North was resumed and air combats became increasingly frequent and once again Phantoms began to add fast to their score while use of "smart" bombs by Phantoms and other U.S. aircraft resulted in fast mounting damages to the North.

Within a few weeks of the renewal of air operations over North Vietnam, Lt. Randall Cunningham, pilot, and Lt. (j.g.) William Driscoll, RIO, flying an F-4J of Fighting Squadron 96 (VF-96 "Fighting Falcons"), set a number of significant firsts while operating from the U.S.S. *Constellation*, the same carrier from which Phantoms had operated for the first strikes against the North and to obtain the first "kill" of the Vietnamese conflict. Being already credited with the destruction of a Mig-21 on 19 January 1972 and of a Mig-17 on 8 May, Lts. Cunningham and Driscoll raised their total to five when they destroyed three MiG-17s during a single flight on 10 May 1972. Albeit their flight did not end on a happy note—both men had to eject off the Vietnamese coast after their aircraft had been hit by a surface-to-air missile but, fortunately, were quickly rescued from the water—Cunningham and Driscoll became the first Aces solely as the result of air combat over Vietnam while in addition they also became the first "Team of Aces" in U.S. Naval history, the first to score a triple kill over Vietnam and the first U.S. all-missile Aces.

With this spectacular success the McDonnell Phantom, first conceived almost 20 years ago as a successor to the McDonnell F3H Demon and developed into the first all-missile U.S. fighter aircraft, truly came into its own while well into its mid-year. In this AIRCAM title, the first of two devoted to this famous fighter, we plan to cover primarily the Phantom's development history while illustrations will essentially depict F-4s in U.S. Navy and U.S. Marine Corps service. A later volume in

An F-4B of the "Black Lions" VF-213 dropping its ordnance on a North Vietnamese target, 23 January 1968. Serial 153001. (US Navy)

this series will be devoted to a detailed account of the Phantom's operational history and will be illustrated with a larger number of illustrations depicting USAF and foreign F-4s.

Naval Phantoms

In answer to an RFP (Request for Proposals) issued by the U.S. Navy in September 1953, Herman D. Barkey and a small team of engineers of the McDonnell Douglas Aircraft Company began low-priority in-house studies aimed at developing a twin-engined, all-weather, successor for the F3H Demon, a type then still plagued by persistent power plant problems. However, as it appeared that the Chance Vought XF8U-1—which had been ordered on 29 June 1953—was going to fulfil the U.S. Navy requirement for supersonic carrier-borne fighters, personnel of the Bureau of Aeronautics encouraged the McDonnell team to re-direct their studies towards the realization of an attack aircraft.

The renewed efforts expanded by Barkey's team were eventually rewarded on 18 October 1956 when the U.S. Navy issued a Letter of Intent covering the planned procurement of two long-range, twin-engined, all-weather attack aircraft to be designated YAH-1s. A new change in direction, however, was soon to follow and on 26 May 1955 it was agreed that the two aircraft (Bu Nos. 142259 and 142260) would be completed as all-weather fighters under the designation XF4H-1. This was then followed by the award on 25 July 1955 of Contract NOa(s)55-272 covering not only the two prototypes previously mentioned in the Letter of Intent but also five pre-production aircraft (143388-143392) and, between 17th and 23rd of November 1955, by the mock-up inspection. At that time, the aircraft was planned around the use of a thin 45-degree swept wing with a constant anhedral angle and was to be powered by a pair of General Electric J79 after-burning turbojets fed by fixed-geometry cheek intakes. For all-weather operations the aircraft was to be fitted with sophisticated avionic equipment necessitating the use of a second crew member seated in tandem behind the pilot while primary armament, which on the still-born YAH-1 was to have consisted in a quartet of 20 mm. cannons, was to be provided by four Sparrow air-to-air missiles mounted semi-submerged beneath the fuselage.

Extensive wind tunnel tests, however, revealed that the proposed Mach 2-plus fighter would, in its contemplated configuration, encounter serious stability problems. Consequently, numerous design changes were necessary and led to the adoption of the now familiar Phantom shape characterized by the use of 12 degrees of dihedral on the folding outer panels, dog-tooth wing leading-edge, one-piece slab tail plane with 23 degrees of anhedral, and variable-geometry air intakes. Initial structural release

With well weathered camouflage this F-4C is seen carrying a heavy load of bombs somewhere over Vietnam. (USAF)

A grey and white with blue trim F-4B of VX-4 about to be launched. (McDonnell)

was not authorized until the last day of 1956 and the maiden flight of the first XF4H-1 did not take place until 27 May 1958.

Delays in the development of the General Electric J79-GE-8 turbojets planned for the F4H-1 necessitated the use of a pair of J79-GE-3A engines on loan from the USAF and with this power plant fitted the XF4H-1 (142259) was first flown from Lambert Field, St. Louis, Missouri, by Robert C. Little. Manufacturers and Navy tests, during which it was found necessary to change the angling of the air intakes, culminated in late 1958 in competitive trials pitching the twin-engined Phantom against the single-engined Chance Vought F8U-3 Crusader III. As a result of this competition won by the Phantom, McDonnell, which already had received on 19 December 1956 a follow-on order for 16 F4H-1s (145307-145317 and 146817-146821) received a contract for 24 additional F4H-1s (148252-148275) on 17 December 1958

As the J79-GE-8 turbojet was still not available for installation on the 45 F4H-1s ordered up to and including the aircraft contracted on 17 December 1958, these Phantoms were each powered by two J79-GE-2 or 2A engines rated at 10,350 lb. (dry) and 16,150 lb. with afterburner. To differentiate these aircraft from later models powered by J79-GE-8 turbojets, the designation F4H-1F—in which the suffix F identified the use of a special powerplant—was adopted for these 45 aircraft until 18 September 1962 when they were re-designed F-4As when the new Tri-Service designation system was inplemented by the U.S. Department of Defence. At that time, the J79-GE-8 powered production F4H-1s, of which 72 had first been ordered under Contract NOa(s)60-0134 dated 23 September 1959, were re-designated F-4Bs.

During the course of test and evaluation a number of changes were progressively incorporated on the F-4As and included a re-design of the canopy to improve vision from the rear cockpit, a revised radome shape to improve radar performance and the installation of a blown-flap system of boundary layer control. Not initially retained for production but leading later to the development of the F-4C tactical fighter for the USAF, was the installation of multiple racks which enabled one of the F4H-1Fs to carry a total of 22,500 lb. bombs beneath its fuselage and inner wings. Concurrent with this development work, the F4H-1F was subjected to intensive evaluation by U.S. Navy personnel, including initial carrier qualification trials performed during February 1960 aboard the U.S.S. *Independence*, which led to the formation of the first Phantom squadron, VF-121 at NAS Miramar, California, during December 1960.

Equipped with F4H-1Fs, VF-121 was quickly followed by a second RAG (Replacement Air Group), VF-101 serving with the Atlantic Fleet, which also initially flew the interim F4H-1Fs. However, following the availability of the more powerful J79-GE-8 engines, the Navy introduced the F4H-1 into service with the formation in 1961 of the first two fully operational Phantom squadrons, VF-114 from the Pacific Fleet and VF-74 of the Atlantic Fleet.

During the course of 1962, with production rate and pilot training gaining momentum, F4H-1s were taken on inventory by an increasing number of units including VMFaw-314, the first Marines Phantom squadron, and the type began to take an active role in the U.S. defence beginning with the Cuban missile crisis. In the course of the tense days which followed the aerial discovery of Russian offensive missiles in Cuba, VF-41, equipped with F-4Bs, was transferred from NAS Oceana, Virginia, to NAS Key West, Florida, for duty with the USAF in the North American Air Defence Command while other Phantoms operating from the U.S.S. *Enterprise* and *Independence* helped impose the quarantine of Cuba.

Excluding a number of F-4As which were brought to full F-4B standards and were re-engined with J79-GE-8s, McDonnell produced a total of 667 F-4Bs (148363-148434, 149403-149474, 150406-150493, 150624-150653, 150992-151021, 151397-151519, 151975-151983, 152207-152331, 152965-153070 and 13 out of 153912-153950). Delivered between 19 June 1961 and 2 March 1967, the F-4Bs were primarily delivered as such to Navy and Marine squadrons but 12 of these aircraft (including 150487, 150492, 150625, 150636, 150642 and 150645) were modified as F-4Gs by fitting AN/ASW-21 data link communications equipment for use under combat conditions which were conducted by VF-213 while deployed in South-east Asia beginning in December 1965. Thirty other F-4Bs were operated on loan by U.S. Air Force and required the USAF serials 62-12167 to 62-12196.

Next naval variant of the Phantom to appear was the unarmed RF-4B reconnaissance aircraft of which nine were first ordered in 1963 under Contract NOw(A)64-0600fd. Intended exclusively so far for operation by Marine squadron, the RF-4B is very similar to the RF-4C ordered earlier by the USAF. Being a naval variant, however, the RF-4B retains the J79-GE-8 engines, probe-type inflight refuelling system and absence of dual-flight controls in the rear cockpit. Furthermore, whereas the nose-mounted cameras of the RF-4C can only be positioned on the ground, those of the RF-4B can be rotated in flight. First delivered on 25 May 1965, the RF-4B has been built in small batches (three contracts—respectively covering 9, 27 and 10 aircraft—have officially been announced) and may still be produced in small numbers.

Still produced in large numbers and now starting to be fitted with leading-edge slats as developed for the USAF F-4E, is the F-4J variant which was first flown on 29 October 1965 and which forms now the mainstay of Navy and Marine squadrons. Powered by two General Electric J79-GE-10 turbojets with an after-burning thrust of 17,900 lb. on take-off, the F4Js have 16·1/2 degree drooping ailerons and slotted tailplane to shorten take-off distance and reduce approach speeds. An improved AWG-10 fire control radar, housed in an enlarged nose radome, has replaced the APQ-72 radar of the F-4Bs and the installation of an AJB-7 bombing system has substantially increased the aircraft ground attack capability. To cope with increased electrical output requirements due to the installation of the new avionics a 30 kVA generator has replaced the 20 kVA generator of the F-4B.

A pair of bombed up F-4H's of VF-41 on a training flight from NAS Anacostia, Washington, DC. Serial of 105 is 149418. (US Navy via J. W. R. Taylor)

Record breaking achievements and other notable flights

Shortly after McDonnell received on 23 September 1959 an initial production contract covering 72 F-4Bs, the first fully operational aircraft in the Phantom series, Navy and Marine Corps pilots began breaking or setting an impressive number of world records. First to fall to Phantoms was the world height record which was obtained on 6 December 1959 by Cdr. L. E. Flint, USN, flying the second XF4H-1 (142260) during Project Top Flight. Taking off from Edwards AFB, California, Cdr. Flint climbed to 50,000 feet where he levelled off to accelerate prior to zooming to 98,556 feet.

September 1960 saw two closed course records broken by Phantoms as on the fifth of that month Lt.-Col. T. H. Miller, USMC, flew his F4H-1F over a 500 km. triangular course in 15 minutes 19.2 seconds. Starting at an altitude of 42,200 feet and at Mach 1.76, Lt.-Col. Miller ended his course at 46,000 feet and Mach 2.1 to establish an official record of 1216.76 m.p.h. over the 500 km. course. However, actual speed, when taking into account the fact that turns took the aircraft off course and thus extended actual distance covered, was approximately 1,305 m.p.h. (Mach 2.0). Twenty days later, Cdr. J. F. Davis, USN, exceeded that speed when flying over a 100 km. closed course set up near Edwards AFB. Entering the course at 45,000 feet and Mach 2.31, Cdr. Davis's F4H-1F averaged 70 degrees of bank and pulled 3g all the way around the turn to exit 2 minutes 40.9 seconds later at 47,000 feet and Mach 2.21. The FAI (Fédération Aéronautique Internationale) homologated this record at 1,390.26 m.p.h. but, as actual distance flown slightly exceeded the 100 km. course, actual speed was 1,459 m.p.h. (Mach 2.24).

To mark the 50th Anniversary of Naval Aviation in the United States, five F4H-1Fs competing for the Bendix Trophy took off at timed intervals from Ontario Airport, California, on 24 May 1961 and set out for Floyd Bennett Field, New York, in an attempt to set a new west to east trans-continental record. In four supersonic dashes at an average altitude of 50,000 feet separated by three subsonic in-flight refuellings at 35,000 feet, the aircraft reached their destination after shattering the existing trans-continental record. The best time—for which the team of Lt. R. F. Gordon, pilot, and Lt. (jg) B. R. Young, Radar Intercept Officer, received the Bendix Trophy—was 2 hours 47 minutes and represented an average speed of 870 m.p.h. for the 2,445.9 mile flight.

Having then acquired the speed record over the 500 km. and 100 km. courses as well as the trans-continental speed record, the F4H-1F was then cleared for attempt against the absolute speed record, and on 28 August 1961 Lt. H. Hardisty, pilot, and Lt. E. H. DeEsch, RIO, set a new low altitude world speed record over the 3 km. course. Taking off from Holloman AFB, New Mexico, this crew flew twice in each direction at a maximum altitude of 125 feet over rough terrain to average 902.769 m.p.h. It then remained for Lt.-Col. R. B. Robinson, USMC, to break the absolute speed record. Taking off from Edwards AFB on 22 November 1961, Lt.-Col. Robinson flew his Phantom twice over a 15/25 km. course at an average speed of 1,606.3 m.p.h. and thus demonstrated the Phantom's true supersonic capability.

Having set one world record in 1959, two in 1960 and three (plus one national record) in 1961, the Phantom went on in 1962 to make a clean sweep of time-to-climb records as part of Project High Jump. For the time-to-height records up to 15,000 metres, all obtained at NAS Brunswick, Maine, the F4H-1 made no-flap take-offs and made a continuous climb to achieve the following marks:

34.52 seconds to 3,000 m., Lt.-Cdr. J. W. Young, USN, 21 February 1962.
48.78 seconds to 6,000 m., Cdr. D. M. Longton, USN, 21 February 1962.
61.62 seconds to 9,000 m., Lt.-Col. W. C. McGraw, USMC, 1 March 1962.
77.15 seconds to 12,000 m., Lt.-Col. W. C. McGraw, USMC, 1 March 1962.
114.54 seconds to 15,000 m., Lt.-Cdr. D. W. Nordberg, USN, 31 March 1962.

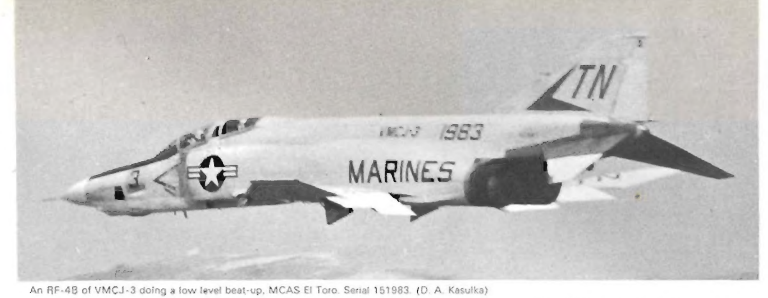
The next three records, which required that the Phantom be levelled off at a prescribed interim altitude prior to re-acceleration, were set from NAS Point Mugu, California, and were officially recorded as follows:

178.50 seconds to 20,000 m., Lt.-Cdr. F. T. Brown, USN, 31 March 1962.
230.44 seconds to 25,000 m., Lt.-Cdr. J. W. Young, USN, 3 April 1962.
371.43 seconds to 30,000m., Lt.-Cdr. D. W. Nordberg, USN, 12 April 1962.

In the process of setting the time to 30,000 m. (98,425 feet), the F4H-1 zoomed over the 100,000 feet mark and thus surpassed its own record of 98,556 feet set on 6 December 1959. This mark, however, was not officially recorded by the Fédération Aéronautique Internationale.

Prior to leaving the subject of world's records, mention must be made of an official record set on 2 December 1966 by four USAF F-4Cs. Refuelled in flight several times, including two night refuellings, these aircraft broke the previous record of 6,710 miles in 14 hours set by three North American F-100s and flew 10,000 miles nonstop in 18 hours to evaluate the aircraft's capabilities and the physiological and psychological effects on the crews under these conditions.

The Phantom also registered an important first in the



An RF-4B of VMCJ-3 doing a low level beat-up, MCAS El Toro. Serial 151983. (D. A. Kasulka)

annals of aerospace when on 25 July 1962 Lt. Alvin Newman of the Naval Ordinance Test Station (NOTS), China Lake, lifted his Phantom loaded with a 3,000 lb. Caleb rocket carrying a scientific payload of 120 lb. After accelerating at an altitude of 26,000 feet, Lt. Newman zoomed his Phantom to 36,000 feet when he launched his two-stage rocket which reached a top altitude of 725 miles. Designated Project Hi-Hoe, this experiment established the feasibility of using a manned aircraft as a recoverable first stage in the orbiting of small satellites.

Twelve weeks earlier, on 10 May 1962, another Navy Phantom operating from Point Mugu had obtained the first successful head-on intercept and kill at supersonic speeds. In this test, a demonstration of the effectiveness of fighter-launched missiles against high-speed aircraft, the Phantom fired a Sparrow III air-to-air missile at a surface-launched Regulers II while both fighter and target were flying at supersonic speeds towards each other.

In a more peaceful role, Phantoms have also been repeatedly used to photograph the early flight phase of space projects as their exceptional speed and rate of climb performance enable them to follow the launch sequence. Equipped with 16 and 35 mm. motion picture cameras, an F-4C was first used in this type of mission during 1963 to photograph the launching of the moon-mapping Ranger capsule. Later, several manned space missions were similarly recorded by Phantoms.

USAF Phantoms

Impressed by the Phantom's spectacular performance and under pressure from Defence Secretary Robert McNamara who wished to reduce defence expenditures through commonality of equipment for the Armed Service, the USAF first evaluated the F4H-1F in 1961 as a potential successor for the Convair F-106A Delta Dart interceptors of the Air Defence Command. In the interceptor role the Phantom had much to commend itself to the USAF as, during actual tests, it proved to be capable of carrying heavier loads than the F-106A over longer distances while having a 25 per cent greater radar range and requiring almost one-third less MMH/FH (Maintenance Man Hour per Flight Hour) than the Delta Dart. However, as a modified Phantom had proved capable of carrying 11,000 lb. of bombs and as its own Republic F-105D Thunderchief was still giving problems, USAF saw a more urgent requirement for tactical fighters.

To meet this requirement, and much to the dismay of Republic Aviation which was in the process of correcting the Thunderchief's teething troubles, the U.S. Department of Defence decided in March 1962 to adopt the Phantom as the next type of fighter, under the designation of F-110A, and of reconnaissance aircraft (RF-110A) for use by TAC, USAFE and PACAF units. Accordingly, McDonnell received on 30 March 1962 a Letter of Intent for one F-110A (62-12199) and on 29 May 1962 a Letter of Intent for two YRF-110As (62-12200 and 62-12201) while full production of the RF-4C, as the RF-110A had been re-designated on 18 September 1962, was authorized by Contract NOw(A)63-0032 dated 31 December 1962. Production of the F-4C, formerly F-110A, was covered by a modification of the same contract dated 8 February 1963.

Preceded in USAF service by the first two of 30 F-4Bs borrowed from the U.S. Navy and received by Tactical Air Command on 24 January 1962, the first "true" USAF Phantom—the F-4C 62-12199—made its initial flight on 27 May 1963 and was followed by the first YRF-4C (62-12200) on 8 August 1963. Retaining the folding wings and arrester gear of the F-4B and intended to serve both as an air superiority fighter and ground attack fighter, the F-4C differed from the original naval Phantom in many respects including: use of J79-GE-15 engines with cartridge starting system, fitting of dual controls in the rear cockpit (whereas the second crew member of Navy and Marine Corps Phantoms works exclusively as a Radar Intercept Officer, the USAF elected to use a two-pilot crew on its Phantoms), low-pressure types and boom inflight refuelling system instead of drogne system. In addition, the F-4Cs were fitted with substantially different electronic gear to suit them to their dual mission.

First delivered on 20 November 1963 when the aircraft went to MacDill AFB, Florida, the F-4C remained in production until 22 February 1967 when the last of 583 aircraft (62-12199, 63-7407 to 63-7713 and 64-654 to 64-928) was handed over to the USAF. Operated by Tactical Air Command and PACAF units, the F-4C became the first Air Force Phantoms to operate in Vietnam from June 1965 onward. Outside of the USAF, the F-4C is operated by two squadrons of Spain's Ejercito del Aire which acquired 36 Phantoms rebuilt by CASA in 1971-72.

Intended to replace its stablemate, the RF-101 Voodoo, the RF-4C differs externally from the F-4C in having a more pointed nose increasing overall length by two feet nine inches. Its primary mission is all-weather, day-night, high-low reconnaissance versions for which it is fitted with three camera stations in the nose, forward-looking and side-looking radars, an infra-red reconnaissance set, and photoflash ejection system. Its usefulness is increased by its ability to process films in flight and to eject cassettes of film at low altitude. As opposed to the Marine RF-4B which is unarmed, the RF-4C retains limited attack capability including the delivery of nuclear weapons. Following delivery of the first production RF-4C in April 1964, more than 500 RF-4C have been delivered and the type remains in production as the standard USAF tactical reconnaissance aircraft; RF-4Cs became the first Phantoms to serve in Air National Guard units when it entered service with the Arkansas ANG during 1971. Meanwhile, the original YRF-4C has been used by McDonnell for a number of tests including the trial installation of the M-61A1 rotary cannon intended for the F-4E and of the fly-by-wire system tested under NASA contract (first flight in this configuration took place on 29 April 1972).

One of the initial batch of 29 standard Navy F-4H1's delivered to the USAF in 1962 as the F-110A subsequently re-designated F-4C. (McDonnell)

Ordered in March 1964 and first flown on 7 December 1965, the F-4D is a development of the F-4C featuring improved avionics to increase its air-to-air gunnery capability and its air-to-ground weapon accuracy. Major new components include a General Electric ASG-22 lead computing sight and an ASQ-91 weapons release computer set while most F-4Ds were fitted with the AN/APA-165 Radar Set Group and the AN/APQ-109A Radar System. When fitted with these radar components, the F-4D can be identified from the F-4C by its larger radome; however, a number of F-4Ds were fitted with AN/APA-157 Radar Set Group similar to that installed in all F-4Cs and, therefore, are externally identical to the first USAF Phantom variant. Internally, the F-4D is characterized by the use of a smaller Number 1 fuel cell in the fuselage—this modification being necessitated to provide space for the additional electronics equipment—and by the installation of 30 kVA generators. Deliveries began on 9 March 1966 and F-4Ds first served with USAFE units prior to being deployed to Vietnam starting in June 1967. F-4D production totalled 825 aircraft including 809 ordered by the USAF (64-929 to 64-996, 65-580 to 65-801, 66-226 to 66-283, 66-7455 to 66-7774 and 66-8685 to 68-8825) and 16 ordered directly for the Imperial Iranian Air Force. Of the 809 F-4Ds ordered by the Air Force, 16 were delivered to the Imperial Iranian Air Force and 18 went to the ROK Air Force under the Military Assistance Programme.

Like the F-4B, F-4C and F-4J, the F-4D relies on four Sparrow air-to-air missiles for its primary armament and can carry externally beneath its fuselage and wings a wide variety of air-to-air and air-to-ground missiles, special weapons (nuclear bombs), conventional bombs, chemical bombs, leaflet bombs, cluster bombs, dispensers, mines, camera pods, ECM pods, tow targets, spray tanks and fuel tanks. To offset the lack of built-in gun armament F-4B, F-4C, F-4D and F-4J can be fitted with up to three externally mounted gun pods. SUU-16/A or SUU-23/A having a 20 mm. Vulcan rotary cannon for the USAF Phantoms, and Hughes Mk. 4 for the naval Phantoms. Albeit satisfactory for use against ground targets, these gun pods were found to have disadvantages in air combat as on one hand they had a tendency to oscillate—thus to lose in accuracy—while on the other hand their use substantially reduced the Phantom's top speed.

Study for a Phantom variant with built-in cannon armament was undertaken by McDonnell in June 1965 and led to the development of the F-4E series. As no space could be found within the existing Phantom airframe, the first YRF-4C was used to test a new nose section in which was fared an external pod housing a single 20 mm. M-61A1 rotary cannon. An initial batch of 99 F-4Es (66-284 to 66-382) was ordered in August 1966 and the first F-4E to be fitted with its cannon made its maiden flight on 30 June 1967.

As a result of the installation of the gun, a smaller AN/APQ-120 solid-state radar was fitted and, to balance the weight of the gun, an additional 95 gallon tank was added in the rear fuselage. Other modifications include the substitution of a pair of J79-GE-17 engines with an after-burning thrust of 17,900 lb. for the J79-GE-15s of the F-4C, RF-4C and F-4D. Current production F-4Es are fitted with leading-edge wing slots, a device which greatly improves the Phantom's dog-fighting capability and which helps to correct the stall-spin problem experienced by the heavier versions of the aircraft, and earlier F-4Es are being retro-fitted with these slots.

Foreign Phantoms

Long restricted to U.S. service, the Phantom is now serving or about to enter service with the air and naval forces of ten foreign nations and indications are that other countries will eventually operate Phantoms. Details of

Dramatic shot of F-4C's refuelling from a KC-135A during a mission over North Vietnam during January 1967. (USAF)

F-4C of the 35th Tactical Fighter Squadron, 347th Tactical Fighter Wing, Yokota Air Base, Japan. (H. Yosunake via R. Flinzer)

these export Phantoms are summarized anon.

Fleet Air Arm: The first export model of the Phantom was designed during 1964 for service with the Royal Navy. The need to enable the aircraft to operate from the smaller British carriers coupled with the wish of HM Government to have 40 to 45 per cent of the aircraft's value produced by the U.K. industry resulted in a number of major modifications. Most important of all these changes was the substitution of a pair of Rolls-Royce Spey R.B. 16B-25R Mk. 201 turbo-fans for the J79 turbo-jets powering all U.S. variants which necessitated a 20 per cent increase in the air intake area as well as a redesign of the lower portion of the aft fuselage. Other changes differentiating the FAA Phantom from the USN Phantom included a lengthening of the nose-wheel leg, a reduction in tailplane anhedral and the use of certain items of British equipment, such as Martin-Baker ejection seats and sundry avionic items. The F-4K retained the AN/AWG-10 radar of the USN's F-4J but the use of a folding radome was necessitated by the smaller hangar lifts of HMS *Ark Royal*.

The initial contract for two YF-4K, and two F-4Ks was officially received by McDonnell on 30 September 1964 and the first YF-4K(XT595) made its first flight on 27 June 1966. Forty-eight production F-4Ks (Phantom FG. Mk. 1s) were later ordered, with deliveries beginning on 25 April 1968, and these aircraft were first operated by 767 Squadron, the Fleet Air Arm's Phantom training unit, which was commissioned at RNAS Yeovilton. Other Phantom FG. Mk. 1s are operated by 892 Squadron aboard HMS *Ark Royal* and from RAF Leuchars (initially from RNAS Yeovilton) while 20 were transferred to the Royal Air Force for use by No. 43 Squadron at RAF Leuchars.

Royal Air Force: In addition to the 20 Phantom FG. Mk. 1s transferred from the Royal Navy, the RAF has ordered two YF-4Ms and 116 F-4Ms which differ from the Fleet Air Arm variant in being configured for ground attack and reconnaissance. Designated Phantom FGR. Mk. 2s by the RAF, these aircraft first entered service with No. 228 OCU at RAF Coningsby during January 1969.

Imperial Iranian Air Force: So far Iran has received 32 F-4Ds, which differ from the USAF aircraft in having a number of classified U.S. ordnance and equipment deleted and in being fitted with fixed inboard wing leading-edge as first developed for the early F-4Es. First entering service on 8 September 1968 with the 306th Fighter Squadron at Mehrabad, these F-4Ds are to be supplemented by at least 100 F-4F, and RF-4Es ordered by the Imperial Iranian Government.

ROK Air Force: To bolster South Korean defence the United States have supplied during 1969 one squadron of 18 F-4Ds to the ROK Air Force.

Haganah Le Israel/Heyl Ha'Avir: Under the code "Project Peace Echo", McDonnell began on 1 July 1968 to produce an initial batch of 44 F-4E fighters and six RF-4E reconnaissance aircraft for Israel. Deliveries began in September 1969 and at least 128 Phantoms have been or are being delivered to the Heyl Ha'Avir.

Luftwaffe: Eighty-eight RF-4Es, which combine features of the USAF F-4F and RF-4C, were ordered by the Federal Republic of Germany on 1 January 1969 with 60 of these aircraft being delivered to Aufklarungschwader 51 at Bremgarten and Aufkl. G52 at Leck (30 aircraft each). The balance of 28 aircraft were intended to be used for conversion training (2 RF-4E) and for testing (2 RF-4Es with the 61 Erprobungstelle) whilst 24 aircraft were to be held in reserve.

After contemplating placing an order for a proposed single-seat development of the Phantom, the Luftwaffe has now ordered 175 F-4Fs—a development of the F-4E—to fill the gap in its equipment pending availability of the MRCA.

Royal Australian Air Force: Pending delivery of its General Dynamics F-111C swing-wing tactical aircraft, the RAAF obtained on loan from the USAF 24 F-4Es (69-7201 to 69-7217, 69-7219 and 69-7220, 69-7304 to 69-7307 and 69-7234). Considerations are presently given to purchasing these aircraft which are serving with Nos. 1 and 6. Squadrons at Amberley, Brisbane.

Ejercito Del Aire: A total of 36 ex-USAF F-4Cs were refurbished by CASA during 1971-72 to equip two fighter-bomber squadrons of the Spanish Air Force.

Koku Jieitai: Potentially the biggest Phantom export customers, the Japanese Air Self-Defence Force initially ordered 104 Phantoms as follows:

two F-4EJs to be built and assembled by McDonnell Douglas, 11 F-4EJs to be delivered by McDonnell Douglas unassembled for completion in Japan, and 63 F-4EJs and 18 RF-4EJs to be built under licence by Mitsubishi Heavy Industries. The first McDonnell Douglas-built F-4EJ was delivered on 16 July 1971 and the first Japanese Phantom unit—the 101st Squadron (Provisional), 7th Air Wing—was formed at Hyakuri during August 1972. Present Japanese defence plans anticipate that eventually the Koku Jieitai will operate 15 squadrons of F-4EJs and RF-4EJs.

Elliniki Vassiliki Aeroporia: Delivery to the Hellenic Air Force of 36 F-4Es are to take place during 1973-74.

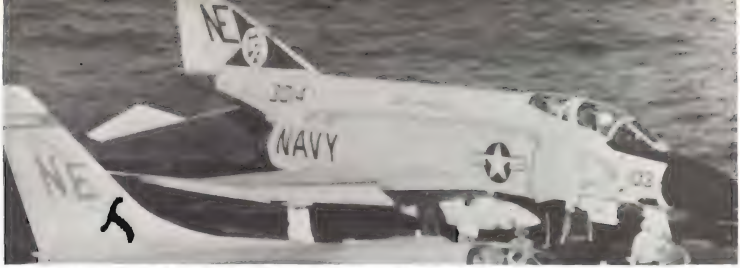
Turk Hava Kuvvetleri: Beginning in late 1973, Turkey is scheduled to receive 40 F-4Es to equip two squadrons.

Above: F-4B, VF-11 streaming its braking chute at Andrews AFB, May 1972. Serial 153024. (J. G. Handelman)

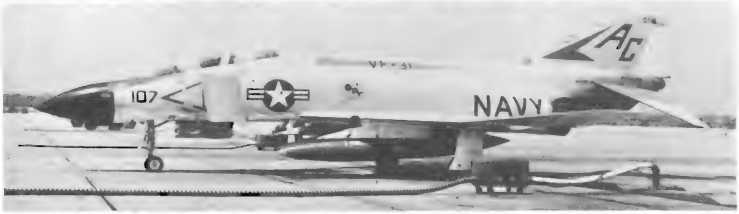
Above: Another F-4B shot at Andrews AFB at the same time as the above, note extended refuelling probes, legend on tank reads 'The World Famous Red Rippers'. Serial 151469. (J. G. Handelman)

Below: An F-4B of VF-11, 'The Red Rippers' shot at an earlier date than the two above, note extra red area on fin and lack of white shadow to lettering. USS Forrestal CVA-59, Atlantic Ocean, 24 June 1968. 152980. (USAF)

Below: F-4B, 150480 of VF-14 at NAS Oceana, June 20 1968. (J. G. Handelman)



Above: An F-4B of VF-21 "Free Lancers" and an A-7A of VA-147 "Argonauts" about to be launched from the USS Ranger, Gulf of Tonkin, December 1967. (US Navy)



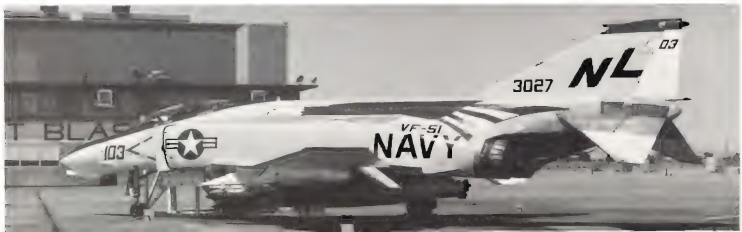
Above: F-4J, 155880 of VF-31 "Felix the Cats" at NAS Oceana during 1968. (J. G. Handelman)

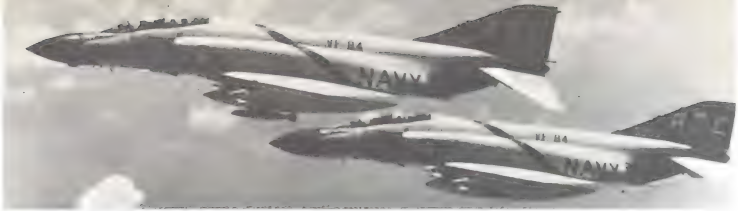
Below: Another F-4J, 155833 of VF-31 in the later markings 1969 flying from the USS Saratoga in the Mediterranean, also known as the "Tomcats". (US Navy)

Below: F-4B of VF-32 at NAS Oceana, wing tips and top of fin yellow, sword yellow with black trim, note anti-dazzle carried over radome. (J. G. Handelman)

Above & below: Two shots of F-4J's of VF-33, AG 202 USS Independence, taken at Andrews AFB. Serials 202 155936 and 202 155781. (Photos J. G. Handelman)

Above & below: Port and starboard shots of F-4B's of VF-51 in the appropriate markings of the "Screaming Eagles", USS *Coral Sea*. Colour side-view in Vol. 2. (Top D. A. Kasulka, bottom Peter Mancus)





Above: A pair of F-4J's of VF-84 "Jolly Rogers" from the USS Roosevelt formating over the Carribean Sea, August 1969. Serials 155854 and 153905.

Below: F-4J 155861 of VF-84 photographed at NAS Miramar in August 1969. (D. A. Kasulka)

Above: F-4B 151432 of VF-96 at Edwards AFB, May 1964. Wing tip and fin markings are black. (D. A. Kasulka)

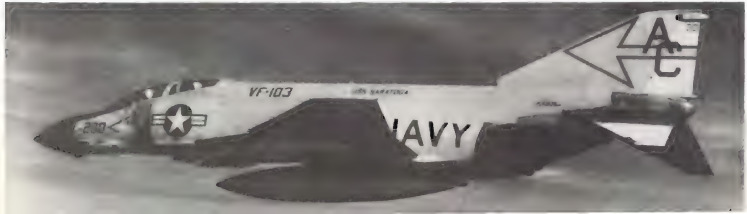
Below: F-4J 155800 of VF-96 from the USS America this Phantom shot down three MiG's in one day over North Vietnam, note unit score on fuselage side. (D. A. Kasulka)

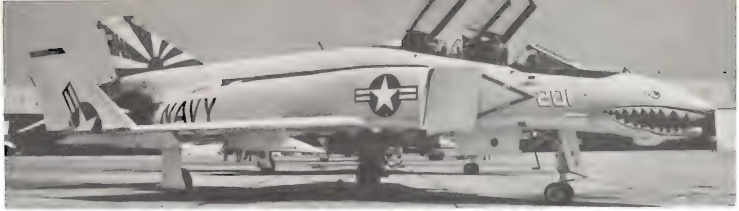
Above: F-4J 155807 of VF-92 from the USS Constellation. (J. G. Handelman)

Above: F-4J 155868 of VF-102 "Diamond Backs" assigned to the USS Independence photographed at Andrews AFB, Maryland on 27 April 1972. (Frank MacSlarrow via Peter Mancus)

Below: F-4J 155802 of VF-102, markings are red and white, notesix white diamonds on red wing tips. (US Navy)

Below: F-4J 155876 of VF-103 "Sluggers" from the USS Saratoga over the Mediterranean Sea, 20 October 1969. (US Navy)

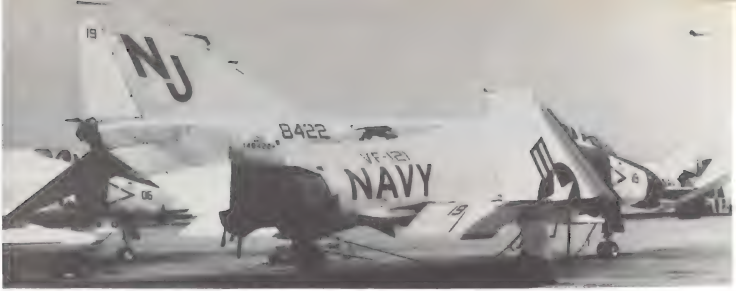




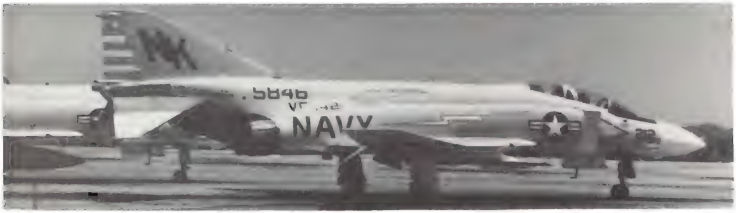
Above: Sharkmouthed F-4B 153019 of VF-111 "Sundowners" photographed at NAS Miramar, 1970. (D. A. Kasulka)

Above: F-4B 153018 VF-114 "Aardvarks" flying a combat mission with wing mounted Sidewinder missiles from the USS Kitty Hawk over Vietnam. Markings are pink and black, nose wing code. Below: 211 153045 of the same unit over the Gulf of Tonkin, March 1968. (US Navy)

Below: F-4J 153784 of VF-121 "Pacemakers", one of the Pacific Fleet training units, flown by Commander Readiness Attack Carrier Air Wing Twelve photographed at Edwards AFB, May 1968. (R. J. Francillon)



Above: F-4H 148422 of VF-121 photographed at NAS Miramar in 1961. (D. A. Kasulka)

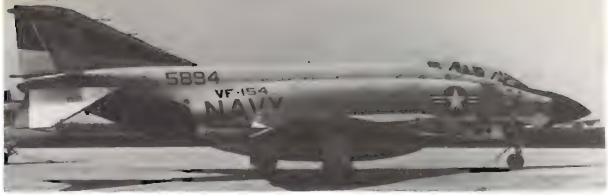


Above: F-4B 155846 of VF-142 "Ghost Riders" seen here in 1972 markings at NAS Miramar. VF-142 and VF-143 flew the first Phantom strikes against North Vietnam from the USS Constellation on 5 August 1964. (Peter Mancus)

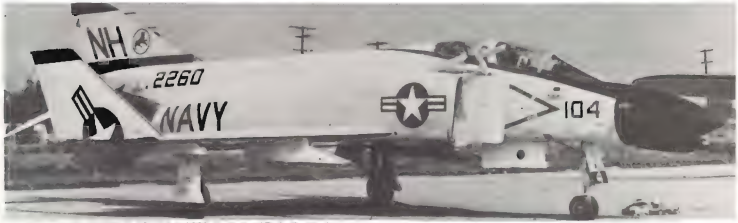
Below: F-4J 155761 VF-143 "Pukin Dogs", the fuselage stripe, wing and tin tips are blue on this aircraft. (Peter Mancus)

Below: Colourful F-4B flown by Commander Attack Carrier Air Wing Five, aircraft assigned to VF-151. Colour side-view in Vol. 2. (D. A. Kasulka)

Right: F-4B 155894 of VF-154 photographed at Andrews AFB, June 1970. (J. G. Handelman)



Below: Strikingly marked F-4B 152243 of VF-161 from the USS Midway. Colour side-view in Vol. 2. (D. A. Kasulka)



Above: F-4B 152206 of VF-213 in 1965 markings. (D. A. Kasulka)

Below: A pair of F-4B's of VF-213 153017 and 153011, loaded with centre-line drop tanks, bombs, Sparrow and Sidewinder missiles make their way towards North Vietnam from the USS Kitty Hawk cruising on Yankee Station, January 1969. (US Navy)

Above: F-4N 150892 of VX 4 in grey and white titanate and below a glossy black F-4J 153783 of the same unit making low level passes streaming smoke. (J. V. G. Vinuesa via A. P. de Jong)

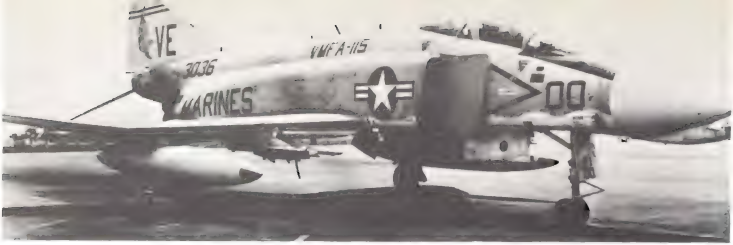
Below: F-4J 153783 of VX 4 Operational Test and Evaluation Force photographed at NAS Point Mugu, October 1969. Colour trim is the same for grey aircraft as shown in black side view. (Tom Reddy)

Below: F-4J 155513 of NATC Service Test photographed during 1971. (J. G. Handelman)

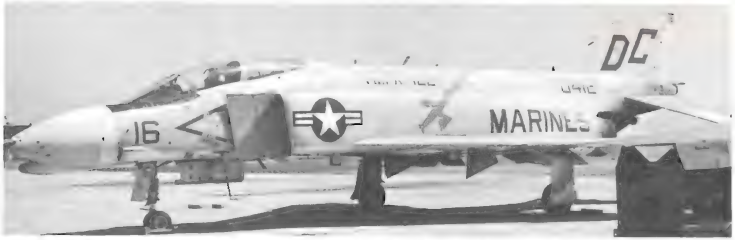
Above: Enthusiastic pilot QF-4B 148935 landing at the Naval Missile Center, Point Mugu, California. (US Navy)

Above: F-4B 151400 of VF-32 from the USS Kennedy, Mediterranean Sea, launches a target drone. (US Navy)

Below: Aircraft No. 6 of the US Navy's precision demonstration team the "Blue Angels" taxiing in at Roosevelt Field, Puerto Rico on 20 March 1970. (US Navy)



Above: F-4B 153036 of VMFA-115 at MCAS Iwakuni, Japan, 1971. (Defence Department via Rowland Gill)



Above: F-4B 150412 of VMFA-122, and below: F-4B 153792 of VMFA-232 "Red Devils". (Photos Fred C. Dickey Jr)

Below: F-4B 152327 of VMFA-251 photographed at MCAS Beaufort in May 1970. (J. T. Brady via Rowland Gill)

Above: F-4B 152291 of VMFA-312, note angle of tail-plane. (J. Sullivan via Peter Mancus)

Above: F-4B 151442 of VMFA-312 photographed at Eglin AFB late 1971. Black and white checks are bordered with yellow above, red below. Colour illustration in Vol. 2. (Tom Brewer via F. Roos)

Above: An F-4B 158389 of VMFA-312 photographed at MCAS Beaufort in the markings of 1968–1969. (D. A. Kasulka)

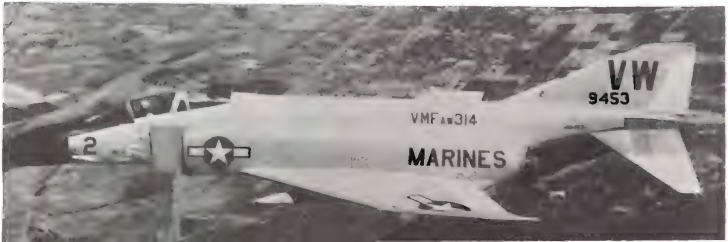
Below: An F-4B 148398 flown by Commander Marine Aircraft Group Thirty-Two, colour side-view in Vol. 2. (F. MacSorley via D. A. Kasulka)

Above: F-4J 153848 of VMFA-333 at MCAS Beaufort, South Carolina, May 1970. Tail markings are green. (J. T. Brady via Rowland Gill)

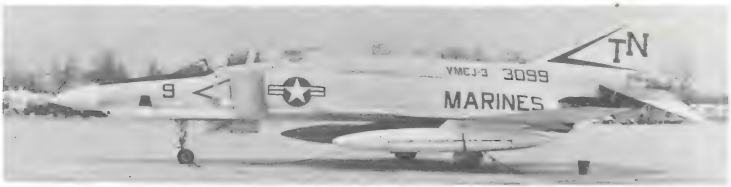
Above: An F-4J 155734 of VMFA-334 on final approach. (Lionel Paul via Peter Mancus)

Above: F-4B 151417 of VMFA-542. (T. Toda via D. A. Kasulka)

Below: F-4B 149453 of VMF AW-314. (US Navy via J. W. R. Taylor)



Above: RF-4B 153098 of VMCJ-3 photographed at Andrews AFB, March 1971. (J. G. Handelman)



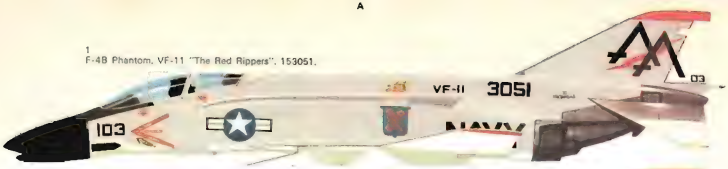
Above: RF-4B 153099 of VMCJ-3 with brown tail letters, green flash on all white fin and rudder. Andrews AFB, February 1972. (J. G. Handelman)

Above: An F-4B 153852 of VMFAT-201 from MCAS Cherry Point photographed during May 1969. (D. A. Kasulka)

Above: F-4J 155829 of VMFAT-201 flown by B. General Tom Miller, MCAS Cherry Point, March 1971. (F. Roos)
Below: RF-4B 153099 of VMCJ-2. (D. A. Kasulka)

Above: RF-4C complete with sharkmouth and a variety of miniature insignias of NATO units emblazoned on its nose taxis out from its hardstanding prior to taking off on a training mission and below another RF-4C of the same unit landing with braking chute streaming. (A. P. de Jong).

1
F-4B Phantom, VF-11 "The Red Rippers", 153051.

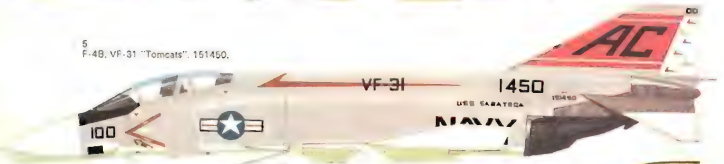


2
F-4B, VF-14, 149408.

3
F-4B, VF-14 "The Red Rippers", 150450.

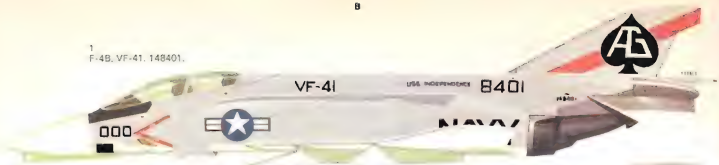
4
F-4B, VF-21 "Free Lancers", 151014.

5
F-4B, VF-31 "Tomcats", 151450.



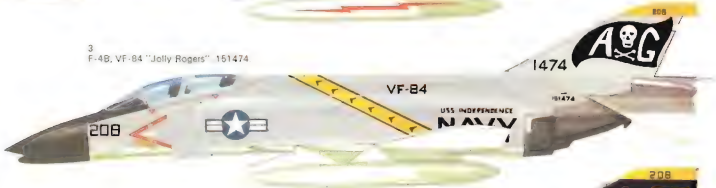
6
F-4J, VF-33, 155781.

1
F-4B, VF-41, 148401.



2
F-4B, VF-74, 148375

3
F-4B, VF-84 "Jolly Rogers", 151474

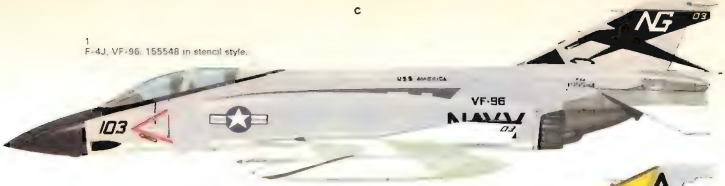


4
F-4B, VF-84 "Jolly Rogers", 151505

5
F-4J, VF-92, 155772

6
F-4J, VF-92, 155807.

1
F-4J, VF-96. 155548 in stencil style.

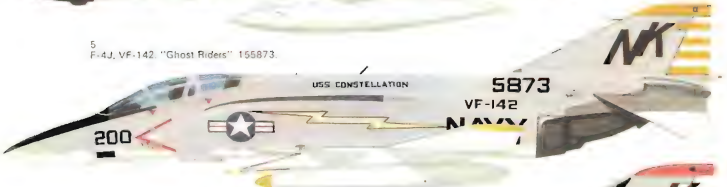


2
F-4B, VF-103. 152288.

3
F-4B, VF-111 "Sundowners". 153019.

4
F-4J, VF-114 "Aardvarks". 157252.

5
F-4J, VF-142. "Ghost Riders". 155873.

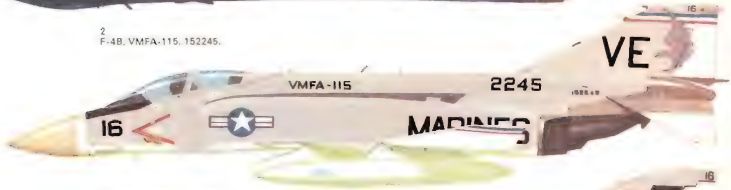


6
F-4J, VF-143. "Pukin Dogs". 155870.


1
F-4J, VF-154, 155894.
5894
VF-154
213
2
F-4B, VF-161, 152267.
USS CORAL SEA
2267
VF-161
206
3
F-4B, VF-161, 152267.
3007
VF-213
102
4
F-4B, VF-213, 153007
VC-7
8252
1
5
F-4B, VC-7, 148252.
8365
40
6
F-4J, VX-4, 153783.
3783
VX-4
9
XF

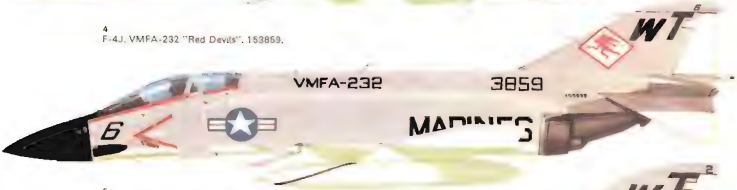
1
F-4J of the Blue Angels Aerobatic Team.

2
F-4B, VMFA-115, 152245.



3
F-4B, VMFA-122, 150412.

4
F-4J, VMFA-232 "Red Devils", 153859.



5
F-4J, VMFA-232 "Red Devils", 153792.

6
F-4B, VMFA-251, 151518.

1
F-4B, VMFA-314, 148418.

2
RF-4B, VMCJ-1, 153093 in stencil style.

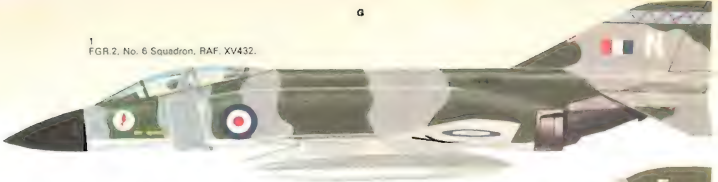
3
RF-4B, VMCJ-3, 153098.

4
F-4C, 149406 of the initial batch of standard Navy F-4H's.

5
F-4E, 4531st Tactical Fighter Wing, Homestead AFB.
Legend on intake reads "City of Homestead".

6
F-4D, 390th TFS, 366th TFW.

1
FGR.2, No. 6 Squadron, RAF, XV432.



2
FG.1, No. 43 Squadron, RAF, XV585.

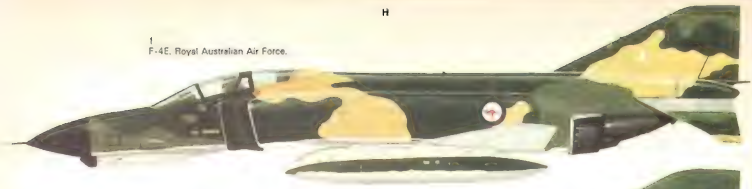
3
FG.1, No. 43 Squadron, RAF, XV592.

4
FGR.2, No. 54 Squadron, RAF, XV462.

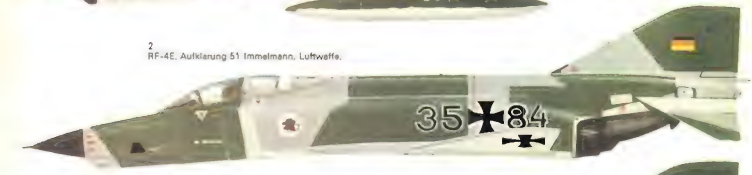
5
FG.1, No. 892 Squadron, FAA, XT859, HMS *Ark Royal*.

6
FG.1, No. 767 Squadron, FAA, XT866. Squadron now disbanded.

1
F-4E, Royal Australian Air Force.



2
RF-4E, Aufklärung 51 Immelmann, Luftwaffe.



3
RF-4E, Aufklärung 52, Luftwaffe.

4
F-4E, Tzvah Haganah Le Israeli/Heyl Ha'Avir.

5
F-4D, ROK Air Force.

6
F-4EJ, Japanese Air Self Defence Force.

Above: Very spick and span F-4D of the 22nd Tactical Fighter Squadron, 36th Tactical Fighter Wing based at Bitburg, Germany. (A. Pelletier)

Below: F-4E of the 47th TFS, 1st TFW, MacDill AFB. Prior to October 1970 it was the 50th TFW.

Below: F-4E of the 56th TFS, 33rd TFW based at Eglin AFB but photographed at Andrews in January 1969. 16th TFS prior to November 1970. (J. G. Handelman)

Below: F-4E flown by the Commander of the 479th TFW, George AFB. Fin top carries the markings of all 479th TFW squadrons. (F. Roos)

Above: F-4D of the 417th TFS, 50th TFW, based at Mountain Home, photographed at Andrews AFB, June 1970. (J. G. Handelman)

Below: F-4E of the 4531st TFW photographed at Andrews AFB in January 1969. Became the 436th TFW in September 1970. (J. G. Handelman)

Below: Sharkmouthed F-4E of the 469th TFS, 388th TFW heading out on a ground attack mission over North Vietnam. (USAF via F. Roos)

Below: F-4D of the 4533rd TFTS, 33rd TFW based at Eglin AFB. Note red fuselage stripe. Photographed during 1970. (J. G. Handelman)

Above: RF-4C of the 22nd TRS, 67th TRW based at Mountain Home AFB. Photographed at Fairchild AFB in October 1970. (A. Swanberg via F. Roos)

Above: RF-4C of the 32nd TRS, 10th TRW based at Alconbury, UK. (via A. P. de Jong)

Below: YF-4E landing after first flight on "Fly by Wire" configuration. Colours are glossy white with medium blue flash on fuselage and glossy dark blue under surfaces. Colour illustration in Vol. 2. (F. Roos)

Below: F-4C of the Armaments Development & Test Center, Air Force Systems Command, ADTC, AFSC, Eglin AFB, summer 1971. Overall glossy grey with red diamonds on white band. (T. Brewer via F. Roos)

Above: FGR.2 (F.4M) XV.470 leading after first flight at Lambert Field with recon pods containing electronic flash units. (McDonnell)

Above: FG.1, No. 43 Squadron, RAF formating with an F.4E of the 525th TFS, 36th TFW over Coblenz. The difference between RAF and USAF camouflage patterns shown to good advantage. (via A. P. de Jong)

Below: FGR.2 of No. 54 Squadron, RAF, note Matra rocket pods. (RAF, MoD)

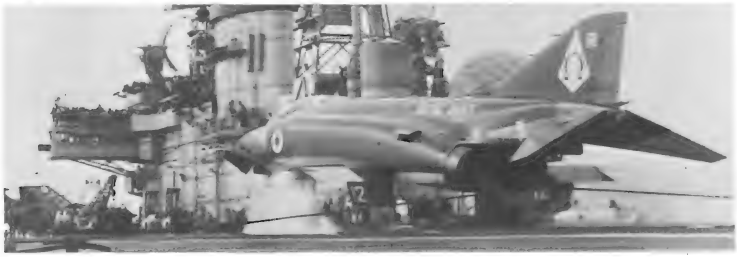
Above: A pair of FGR 2's of No. 54 Squadron about to take off from Akrotiri, Cyprus. (via Air Pictorial)

Above: Tail pipe view of a FGR 2 of No 14 Squadron RAF on the hardstanding at Bruggen, Germany. The first squadron based in Germany to receive the Phantom. (P. R. March)

Below: An FGR 2 of the second squadron based in Germany to receive Phantoms, No. 17 also based at Bruggen. Note the raked fin flash. (RAF Germany via Air Pictorial)

Below: An FGR 2 of No. 6 Squadron with "Flying Can-Opener" insignia on nose and "gunners stripe" on tail. (RAF, MoD)

An FG.1 of No. 892 Squadron, FAA being launched from the waist catapult of HMS Ark Royal, clearly shown in this shot is the lengthened nosewheel leg, below 012 landing on, and bottom 010 being prepared for launching. (Royal Navy, MoD)



Above: 001 flown by Lt. Cdr. Brian Davies obtained the fastest West–East time, 4hr. 46min. 57sec., in the Daily Mail's transatlantic Air Race, May 1969. Serial XT859. (D. W. Menard)

Above: A pair of FG.1's of the recently disbanded No. 767 Squadron, FAA. Serial of 158 is XT868. (via Air Pictorial)

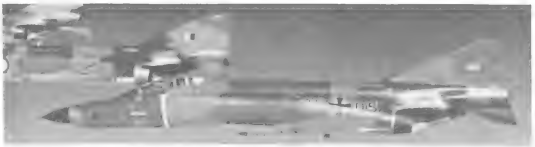
Below: Starboard shot of 158 on the hardstanding at RNAS Yeovilton. (A. Pelletier)

Below: 160 XT876 of No. 767 Squadron, note 60 on tail chute door. (D. W. Menard)

Above. A formation of Royal Australian Air Force F-4E Phantoms in standard USAF camouflage. As the Phantoms are only on loan they have not been given the customary RAAF serials, instead the last one/two digits of the USAF serial have been painted in white on the fin. Wing insignia is USAF style. (RAAF)

Below. Port and starboard shots of RAAF F-4E's, 05 and 13 R. W. Kerr via D. A. Noble; 4 by A. R. Mills via D. A. Noble. Photographed at Canberra April 1971

Above: RF-4E of Aufklarung 51 Immelmann Luftwaffe in standard green and grey splinter scheme. (Photos H Redemann)



Right: Luftwaffe RF-4E formating with a FAA FG.1. (McDonnell)

Below: RF-4E of Aufklarung 52 photographed at Leck, Germany in March 1972. (Udo Weisse via Peter Mancus)

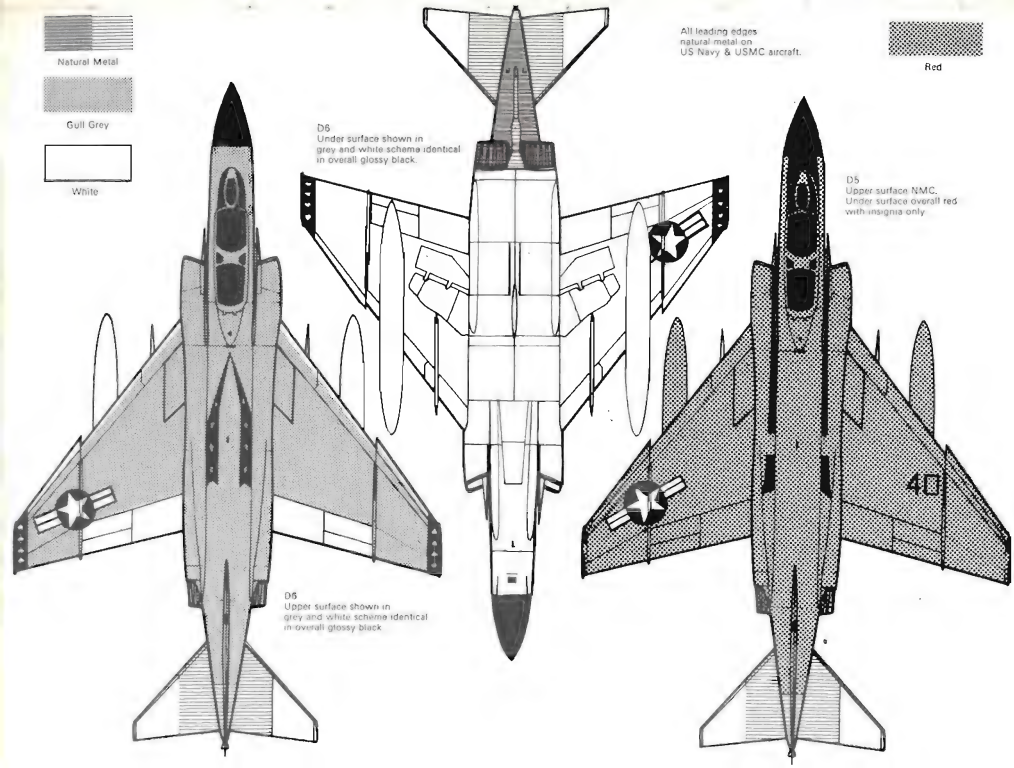
Below: Starboard side shot of a AG RF-4E. (Kurt Thomsen)

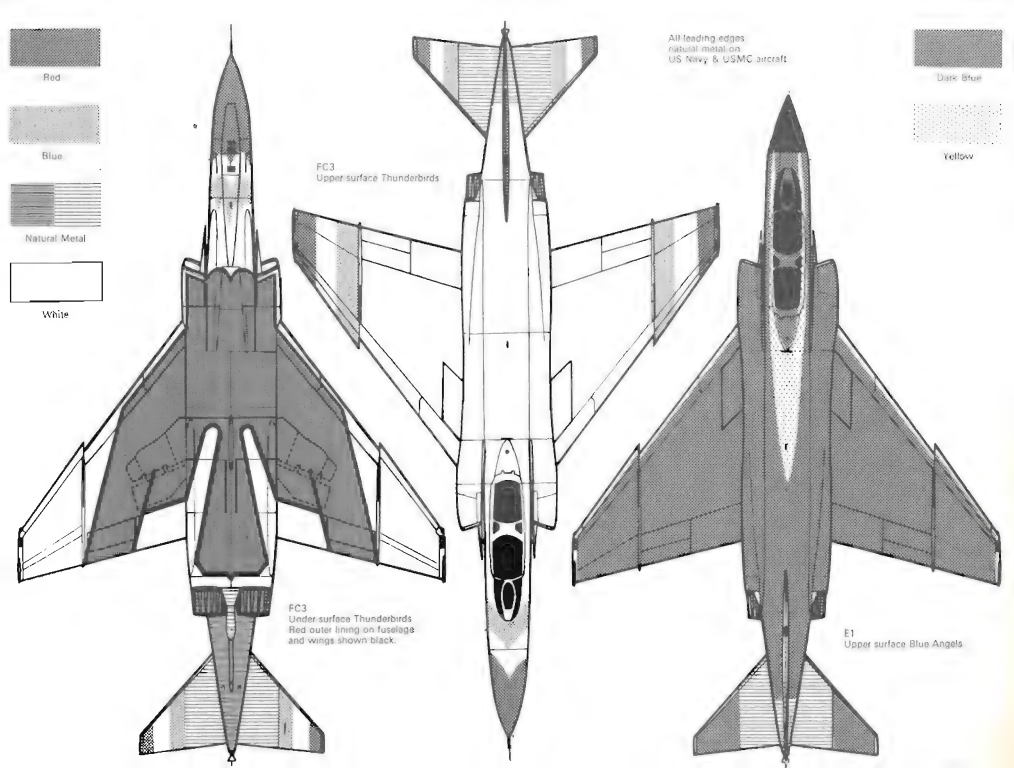
Above: F-4E's are the latest fighter type in service with the Tsvah Haganah Le Isreal/Heyl Ha Avir, delivery beginning in September 1969. Note wing insignia is USAF style. (Heyl Ha Avir)

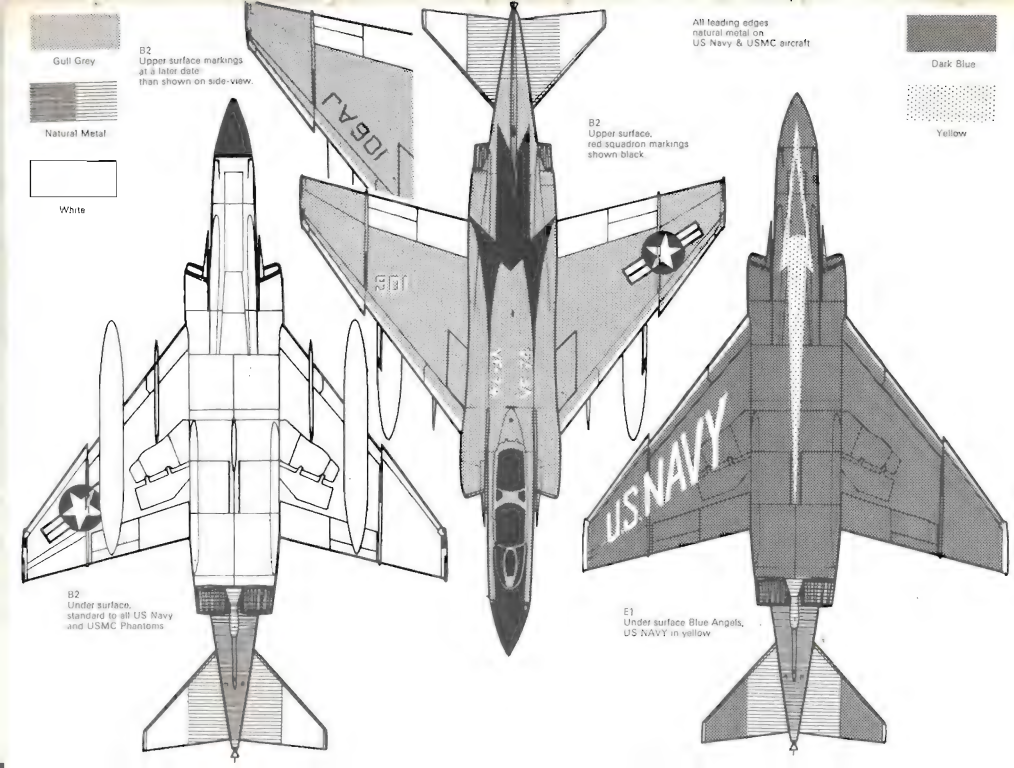
Below: 67-548 one of eighteen F-4D's of the ROK Air Force. Wing insignia USAF style. (McDonnell)

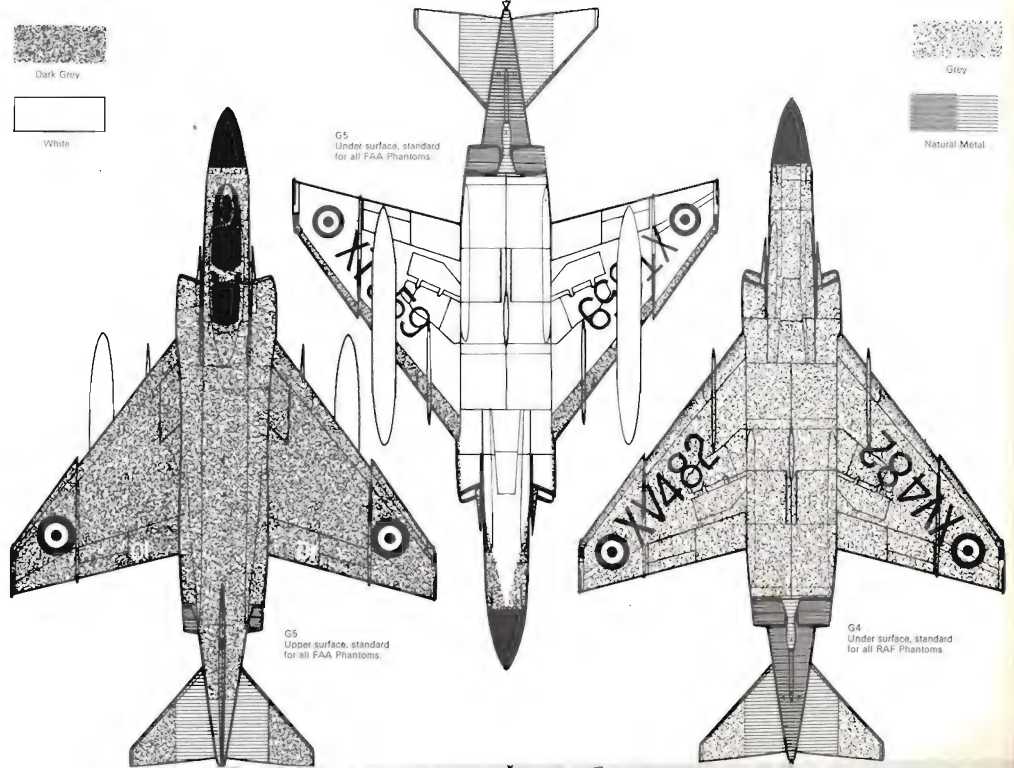
Below: An F-4D of the 306th Fighter Squadron, Imperial Iranian Air Force. Colour side-view in Vol. 2. (McDonnell)

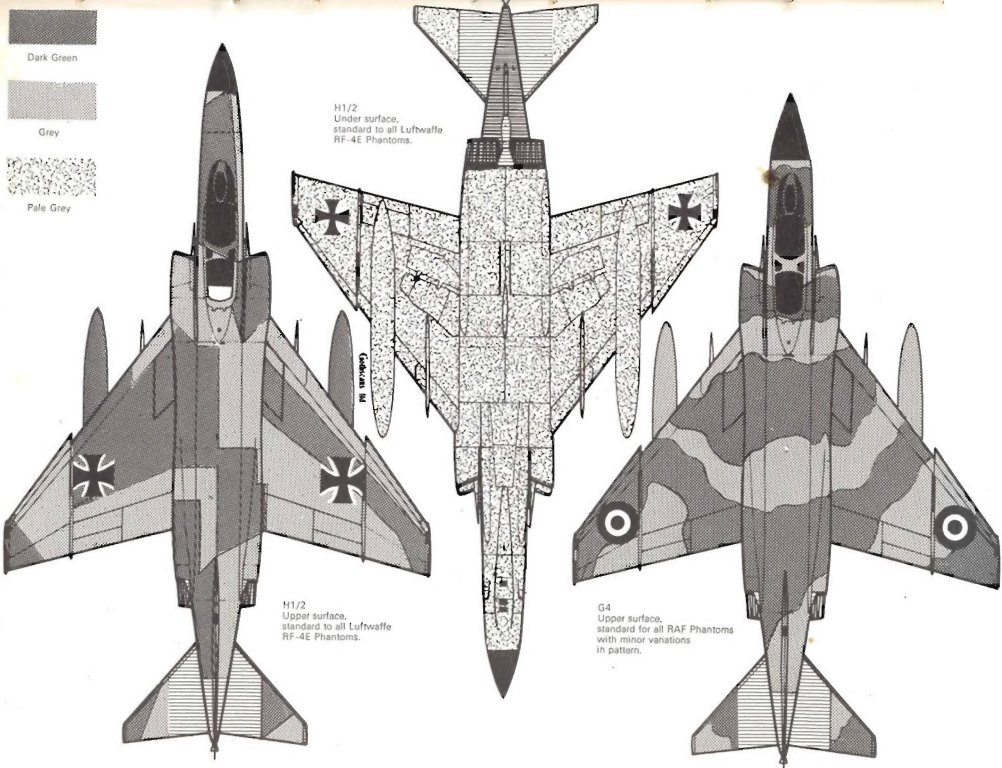
Below: F-4EJ of the JASDF, illustrated is the first of two built by McDonnell-Douglas, which will be followed by a substantial number of Japanese built F-4EJ's and RF-4EJ's. (McDonnell)

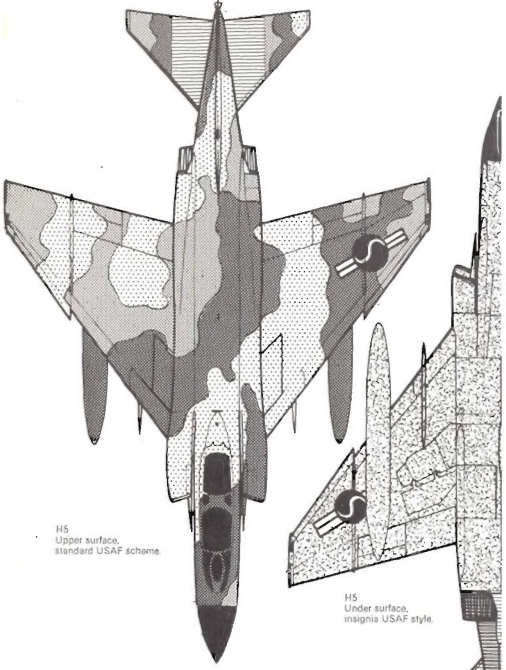

Natural Metal
Gull Grey
White
All leading edges natural metal on US Navy & USMC aircraft.
Red
D6
Under surface shown in grey and white scheme identical in overall glossy black.
D5
Upper surface NMC. Under surface overall red with insignia only.
D6
Upper surface shown in grey and white scheme identical in overall glossy black.


Red
Blue
Natural Metal
White
All leading edges
natural metal on
US Navy & USMC aircraft
Dark Blue
Yellow
FC3
Upper surface Thunderbirds
FC3
Under surface Thunderbirds
Red outer lining on fuselage
and wings shown black.
E1
Upper surface Blue Angels


Gull Grey
Natural Metal
White
B2
Upper surface markings
at a later date
than shown on side-view.
All leading edges
natural metal on
US Navy & USMC aircraft
Dark Blue
Yellow
B2
Upper surface,
red squadron markings
shown black.
B2
Under surface,
standard to all US Navy
and USMC Phantoms
E1
Under surface Blue Angels,
US NAVY in yellow
USNAVY

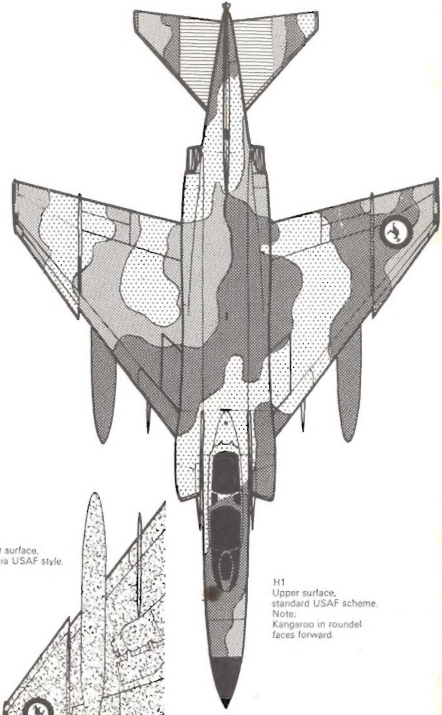

Dark Grey
White
Grey
Natural Metal
G5
Under surface, standard
for all FAA Phantoms.
XV582
XV582
G5
Upper surface, standard
for all FAA Phantoms.
XV482
XV482
G4
Under surface, standard
for all RAF Phantoms.


Dark Green
Grey
Pale Grey
H1/2
Under surface,
standard to all Luftwaffe
RF-4E Phantoms.
Gabcats 84
H1/2
Upper surface,
standard to all Luftwaffe
RF-4E Phantoms.
G4
Upper surface,
standard for all RAF Phantoms
with minor variations
in pattern.



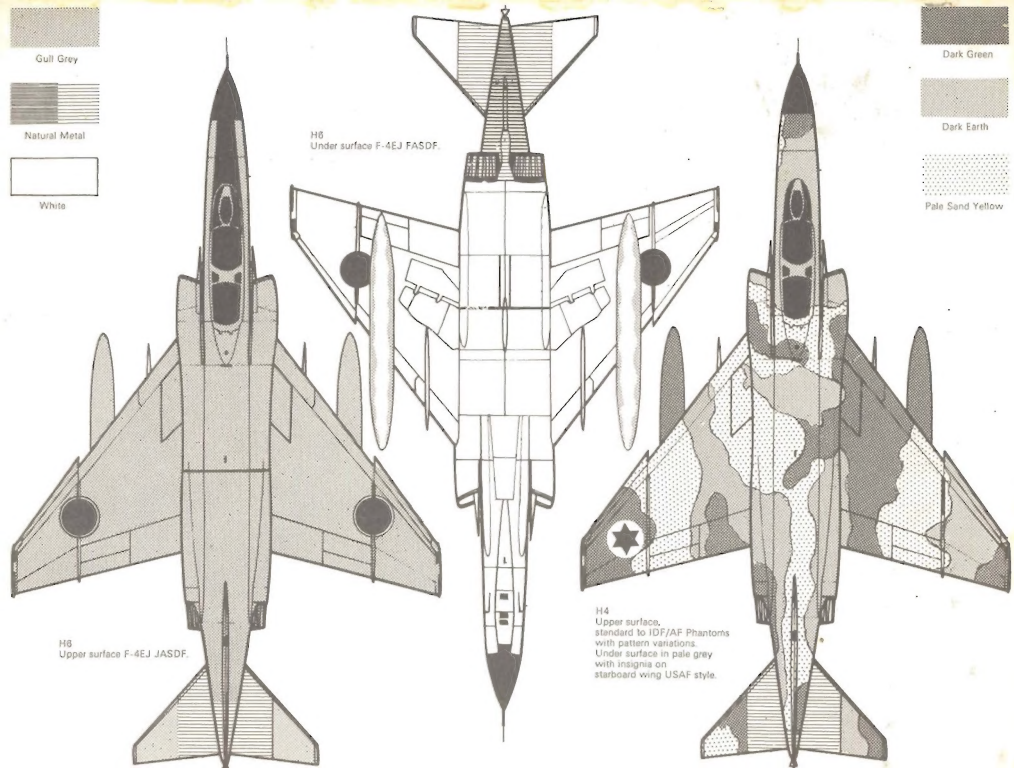
H5
Upper surface,
standard USAF scheme.

H5
Under surface,
insignia USAF style.



H1
Upper surface,
standard USAF scheme.
Note:
Kangaroo in roundel
faces forward.

H1
Under surface,
insignia USAF style.


Gull Grey
Natural Metal
White
Dark Green
Dark Earth
Pale Sand Yellow
H6
Under surface F-4EJ FASDF.
H6
Upper surface F-4EJ JASDF.
H4
Upper surface,
standard to IDF/AF Phantoms
with pattern variations.
Under surface in pale grey
with insignia on
starboard wing USAF style.

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Netherlands East Indies Air Force

West German Luftwaffe

Front cover, top to bottom:
FC1 F-4B, VF-33, 151474.
FC2 F-4B, VMFA-323, 151463.
FC3 F-4C, Thunderbirds Aerobatic Team.
FC4 RF-4C, 15th TRS, 18th TFW.

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